Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

NATIONAL GUIDELINE CLEARINGHOUSE

General

Guideline Title

Prevention of dental caries in children from birth through age 5 years: U.S. Preventive Services Task Force recommendation statement.

Bibliographic Source(s)

U.S. Preventive Services Task Force. Prevention of dental caries in children from birth through age 5 years: U.S. Preventive Services Task Force recommendation statement. Pediatrics. 2014 Jun;133(6):1102-11. [41 references] PubMed

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: Calonge N. Prevention of dental caries in preschool children: recommendations and rationale. Am J Prev Med. 2004 May;26(4):326-9.

This guideline meets NGC's 2013 (revised) inclusion criteria.

Recommendations

Major Recommendations

The U.S. Preventive Services Task Force (USPSTF) grades its recommendations (A, B, C, D, or I) and the quality of the overall evidence for a service (High, Moderate, and Low). The definitions of these grades can be found at the end of the "Major Recommendations" field.

Summary of Recommendations and Evidence

The USPSTF recommends that primary care clinicians prescribe oral fluoride supplementation starting at age 6 months for children whose water supply is deficient in fluoride. (B recommendation)

The USPSTF recommends that primary care clinicians apply fluoride varnish to the primary teeth of all infants and children starting at the age of primary tooth eruption. (B recommendation)

See the Clinical Considerations section for additional information on these preventive interventions.

The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of routine screening examinations for dental caries performed by primary care clinicians in children from birth to age 5 years. (I Statement)

See the Clinical Considerations section for suggestions for practice regarding the I statement.

The target audience for USPSTF recommendations is primary care clinicians, who provide a wide range of health care services to individuals. Although dentists can be considered primary care providers of oral health needs, for the purposes of this recommendation statement, a primary care clinician or primary care provider is defined as a nondental health care professional (e.g., physician, nurse practitioner).

Clinical Considerations

Patient Population Under Consideration

This recommendation applies to children age 5 years and younger. The USPSTF limited its consideration of caries screening and prevention by primary care clinicians to infants and preschool-aged children. The rationale for this decision was that, at the present time, nondental primary care clinicians are more likely than dentists to have contact with children ages 5 years and younger in the United States; this situation changes as children reach school age and beyond. In addition, as children grow older, dental professionals use sealants rather than fluoride varnish. As such, the USPSTF limited its review of the evidence of preventive interventions for dental caries to this age group. This recommendation should not be construed to imply that preventive interventions for dental caries should cease after 5 years of age.

Assessment of Risk

All children are at potential risk for dental caries; those whose primary water supply is deficient in fluoride (defined as containing <0.6 ppm F) are at particular risk. Although there are no validated multivariate screening tools to determine which children are at higher risk for dental caries, there are a number of individual factors that elevate risk. Higher prevalence and severity of dental caries are found among minority and economically disadvantaged children. Other risk factors for caries in children include frequent sugar exposure, inappropriate bottle feeding, developmental defects of the tooth enamel, dry mouth, and a history of previous caries. Maternal and family factors also can increase children's risk. These factors include poor oral hygiene, low socioeconomic status, recent maternal caries, sibling caries, and frequent snacking. Additional factors associated with dental caries in young children include lack of access to dental care; inadequate preventive measures, such as failure to use fluoride-containing toothpastes; and lack of parental knowledge about oral health.

Some organizations have advocated restricting fluoride varnish use to children at "increased risk." Although several caries risk assessment tools exist, none have been validated in the primary care setting, nor do existing studies demonstrate that these tools, when used by primary care clinicians, can accurately and consistently differentiate between children who will develop dental caries and those who will not. A risk-based approach to fluoride varnish application will miss opportunities to provide an effective dental caries preventive intervention to children who could benefit from it, particularly because currently, in the United States, infants and preschool-aged children are more likely to have regular visits with nondental primary care clinicians than dental care providers.

Interventions to Prevent Dental Caries

As noted previously, oral fluoride supplementation prevents dental caries in patients with inadequate water fluoridation.

All children with erupted teeth can potentially benefit from the periodic application of fluoride varnish, regardless of the levels of fluoride in their water. Although the evidence to support varnish is drawn from higher-risk populations, the provision of varnish to all children is reasonable, as the prevalence of risk factors is high in the U.S. population, the number needed to treat is low, and the harms of the intervention are small to none.

The USPSTF did not review the evidence on the effectiveness of tooth brushing, but regular tooth brushing with fluoride toothpaste by children is very important in preventing dental caries.

Timing and Dosage of Preventive Interventions

No studies specifically addressed the dosage and timing of oral fluoride supplementation in children with inadequate water fluoridation. The American Dental Association (ADA) recommendations on the dosage of and age at which to start dietary fluoride supplementation take into account the amount of fluoride in the child's water source. These dosing recommendations also are referenced by the American Academy of Pediatrics (AAP).

No study directly assessed the appropriate ages at which to start and stop the application of fluoride varnish. Available trials of fluoride varnish enrolled children ages 3 to 5 years; however, given the mechanism of action of this intervention, benefits are very likely to accrue starting at the time of primary tooth eruption. Limited evidence found no clear effect on caries increment between performing a single fluoride varnish once every 6 months versus once a year or between a single application every 6 months versus multiple applications once a year or every 6 months.

Suggestions for Practice Regarding the I Statement

In deciding whether to routinely perform screening examinations for dental caries in children from birth to age 5 years, clinicians should consider the following factors.

Potential Preventable Burden

Dental caries is the most common chronic disease in children in the United States. It is 4 times more common than childhood asthma and 7 times more common than hay fever. According to the National Health and Nutrition Examination Survey (NHANES), the prevalence of dental caries has risen from 24% to 28% between 1988–1994 and 1999–2004. Approximately 20% of surveyed children with caries had not received treatment. Symptomatic dental caries in children are associated with pain, loss of teeth, impaired growth, and decreased weight gain, and can affect appearance, self-esteem, speech, and school performance. Dental-related concerns lead to the loss of more than 54 million school hours each year.

Potential Harms

No studies examined the harms of performing primary care screening examinations for dental caries in children from birth to age 5 years. However, given the noninvasive nature of an oral examination, these harms are expected to be minimal.

Current Practice

In one study, only about half of pediatricians reported examining the teeth of half of their patients ages 0 to 3 years.

Other Approaches to Prevention

In April 2013, the Community Preventive Services Task Force recommended fluoridation of community water sources based on strong evidence of effectiveness in reducing dental caries. It also recommends school-based dental sealant delivery programs to prevent caries.

Xylitol may have promise as an additional method to reduce the risk for dental caries. Xylitol is classified by the US Food and Drug Administration as a dietary supplement and is found in over-the-counter consumer products, such as wipes or gum. A single small, fair-quality trial of xylitol wipes use in children ages 6 to 35 months found a 91% relative reduction in decayed, missing, or filled surface increment; however, 4 other studies showed no clear effect of xylitol on caries risk in children younger than 5 years. As such, there is currently not enough evidence to formally recommend its routine use in caries prevention.

Definitions:

What the United States Preventive Services Task Force (USPSTF) Grades Mean and Suggestions for Practice

Grade	Grade Definitions	Suggestions for Practice
A	The USPSTF recommends the service. There is high certainty that the net benefit is substantial.	Offer/provide this service.
B	The USPSTF recommends the service. There is high certainty that the net benefit is moderate or there is moderate certainty that the net benefit is moderate to substantial.	Offer/provide this service.
C	The USPSTF recommends selectively offering or providing this service to individual patients based on professional judgment and patient preferences. There is at least moderate certainty that the net benefit is small.	Offer/provide this service for selected patients depending on individual circumstances.
D	The USPSTF recommends against the service. There is moderate or high certainty that the service has no net benefit or that the harms outweigh the benefits.	Discourage the use of this service.
I Statement	The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of the service. Evidence is lacking, of poor quality or conflicting, and the balance of benefits and harms cannot be determined.	Read "Clinical Considerations" section of USPSTF Recommendation Statement (see "Major Recommendations" field). If the service is offered, patients should understand the uncertainty about the balance of benefits and harms.

USPSTF Levels of Certainty Regarding Net Benefit

Definition: The U.S. Preventive Services Task Force defines certainty as "likelihood that the USPSTF assessment of the net benefit of a preventive service is correct." The net benefit is defined as benefit minus harm of the preventive service as implemented in a general, primary care population.

The USPSTF assigns a certainty level based on the nature of the overall evidence available to assess the net benefit of a preventive service.

Level of Certainty	Description
High	The available evidence usually includes consistent results from well-designed, well-conducted studies in representative primary care populations. These studies assess the effects of the preventive service on health outcomes. This conclusion is therefore unlikely to be strongly affected by the results of future studies.
Moderate	The available evidence is sufficient to determine the effects of the preventive service on health outcomes, but confidence in the estimate is constrained by factors such as: • The number, size, or quality of individual studies • Inconsistency of findings across individual studies • Limited generalizability of findings to routine primary care practice • Lack of coherence in the chain of evidence As more information becomes available, the magnitude or direction of the observed effect could change, and this change may be large enough to alter the conclusion.
Low	The available evidence is insufficient to assess effects on health outcomes. Evidence is insufficient because of: • The limited number or size of studies • Important flaws in study design or methods • Inconsistency of findings across individual studies • Gaps in the chain of evidence • Findings not generalizable to routine primary care practice • A lack of information on important health outcomes More information may allow an estimation of effects on health outcomes.

Clinical Algorithm(s)

None available

Scope

Disease/Condition(s)

Dental caries

Guideline Category

Prevention

Risk Assessment

Screening

Clinical Specialty

Dentistry

Family Practice

Pediatrics

Preventive Medicine

Intended Users

Advanced Practice Nurses

Allied Health Personnel

Physician Assistants

Physicians

Public Health Departments

Guideline Objective(s)

- To summarize the evidence on prevention of dental caries by primary care clinicians in children 5 years and younger, focusing on screening for caries, assessment of risk for future caries, and the effectiveness of various interventions that have possible benefits in preventing caries
- To update the 2004 U.S. Preventive Services Task Force (USPSTF) recommendation on prevention of dental caries in preschool-aged children

Target Population

Children age 5 years and younger

Interventions and Practices Considered

1. Oral fluoride supplementation
2. Fluoride varnish
3. Routine screening examinations (considered but not recommended)

Major Outcomes Considered

- Key Question 1: How effective is oral screening (including risk assessment) by the primary care clinician in preventing dental caries in children <5 years of age?
- Key Question 2: How accurate is screening by the primary care clinician in identifying children <5 years of age who:
    a. Have cavitated or noncavitated caries lesions?
    b. Are at increased risk for future dental caries?
- Key Question 3: What are the harms of oral health screening by the primary care clinician?
- Key Question 4: How effective is parental or caregiver/guardian oral health education by the primary care clinician in preventing dental caries in children <5 years of age?
- Key Question 5: How effective is referral by a primary care clinician to a dentist in preventing dental caries in children younger than 5 years of age?
- Key Question 6: How effective is preventive treatment (dietary fluoride supplementation, topical fluoride application, or xylitol) in preventing dental caries in children <5 years of age?
- Key Question 7: What are the harms of specific oral health interventions for prevention of dental caries in children <5 years of age (parental or caregiver/guardian oral health education, referral to a dentist, and preventive treatments)?

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

Note from the National Guideline Clearinghouse (NGC): A systematic evidence review was prepared by the Pacific Northwest Evidence-based Practice Center (EPC), Oregon Health & Science University, for the U.S. Preventive Services Task Force (USPSTF) (see the "Availability of Companion Documents" field).

Search Strategies

EPC staff searched Ovid Medline (January 1999 to March 8, 2013) and the Cochrane Library Database (through the first quarter of 2013) for relevant articles, and reviewed reference lists for additional citations. Search strategies are shown in Supplemental Appendix 1 in the evidence review (see supplemental information in the "Availability of Companion Documents" field).

Study Selection and Processes

Abstracts were selected for full-text review if they included children <5 years old (including those with caries at baseline), were relevant to a key question, and met the predefined inclusion criteria (Supplemental Appendix 2 of the evidence review [supplemental information in the "Availability of Companion Documents" field]). The EPC staff restricted inclusion to English-language articles and excluded studies published only as abstracts. Studies of nonhuman subjects were also excluded, and studies had to report original data.

EPC staff focused on studies of screening or diagnostic accuracy performed in primary care settings. For preventive treatments (key question 6), EPC staff also included studies of primary care–feasible treatments (treatments that could be administered or prescribed without requiring extensive dental training) performed in non–primary care settings. Treatment interventions were parental or caregiver education, referral to a dentist by a primary care clinician, and preventive treatments, including dietary fluoride supplementation, fluoride varnish, and xylitol. Interventions not commonly used or available in the United States (such as chlorhexidine varnish, povidone iodine rinses, and alternative methods for applying topical fluoride) are discussed in the full report, as are studies that compared different doses of xylitol. Outcomes included decreased incidence of dental caries and associated complications and harms, including dental fluorosis. Many studies reported a composite caries outcome of the presence of 1 or more decayed (noncavitated or cavitated), missing (due to caries), or filled tooth surfaces in preschool-age children. The abbreviation dmfs refers to decayed, missing, or filled primary tooth surfaces, and dmft refers to decayed, missing, or filled primary teeth (1 tooth may have more than 1 affected surface).

EPC staff included randomized controlled trials, nonrandomized controlled clinical trials, and cohort studies for all key questions. They also included an updated systematic review originally included in the 2004 USPSTF review of observational studies on risk of enamel fluorosis. Community interventions for prevention of dental caries and school-based interventions for older children are addressed elsewhere by the US Community Services Task Force.

At least 2 reviewers independently evaluated each study to determine inclusion eligibility. One investigator abstracted details about each article's study design, patient population, setting, screening method, treatment regimen, analysis, follow-up, and results. A second investigator reviewed data abstraction for accuracy.

Number of Source Documents

- Key Question 1: No studies
- Key Question 2: 1 study
- Key Question 3: No studies
- Key Question 44: 2 studies
- Key Question 5: 1 study
- Key Question 6: 15 studies
- Key Question 7: 3 studies

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Two investigators independently applied criteria developed by the U.S. Preventive Services Task Force to rate the quality of each study as good, fair, or poor (see Supplemental Appendix 3 in the evidence review [see supplemental information in the "Availability of Companion Documents" field]).

Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

Note from the National Guideline Clearinghouse (NGC): A systematic evidence review was prepared by the Pacific Northwest Evidence-based Practice Center (EPC), Oregon Health & Science University, for the U.S. Preventive Services Task Force (USPSTF) (see the "Availability of Companion Documents" field).

Quality Assessment and Synthesis

Two investigators independently applied criteria developed by the USPSTF to rate the quality of each study as good, fair, or poor. Discrepancies were resolved through a consensus process. See Table 1 in the evidence review for a list of quality ratings for the included randomized trials. The EPC staff assessed the aggregate internal validity (quality) of the body of evidence for each key question ("good," "fair," "poor") using methods developed by the USPSTF, based on the number, quality, and size of studies; consistency of results among studies; and directness of evidence. Meta-analysis was not attempted because of methodological shortcomings in the studies and differences across studies in design, interventions, populations, and other factors.

Methods Used to Formulate the Recommendations

Balance Sheets

Expert Consensus

Description of Methods Used to Formulate the Recommendations

The U.S. Preventive Services Task Force (USPSTF) systematically reviews the evidence concerning both the benefits and harms of widespread implementation of a preventive service. It then assesses the certainty of the evidence and the magnitude of the benefits and harms. On the basis of this assessment, the USPSTF assigns a letter grade to each preventive service signifying its recommendation about provision of the service (see Table below). An important, but often challenging, step is determining the balance between benefits and harms to estimate "net benefit" (that is, benefits minus harms).

Table 1. U.S. Preventive Services Task Force Recommendation Grid*

Certainty of Net Benefit	Magnitude of Net Benefit			
	Substantial	Moderate	Small	Zero/Negative
High	A	B	C	D
Moderate	B	B	C	D

Low Certainty of Net Benefit	Insufficient Magnitude of Net Benefit			
	Substantial	Moderate	Small	Zero/Negative

**A, B, C, D*, and *I (Insufficient)* represent the letter grades of recommendation or statement of insufficient evidence assigned by the USPSTF after assessing certainty and magnitude of net benefit of the service (see the "Rating Scheme for the Strength of the Recommendations" field).

The overarching question that the USPSTF seeks to answer for every preventive service is whether evidence suggests that provision of the service would improve health outcomes if implemented in a general primary care population. For screening topics, this standard could be met by a large randomized, controlled trial (RCT) in a representative asymptomatic population with follow-up of all members of both the group "invited for screening" and the group "not invited for screening."

Direct RCT evidence about screening is often unavailable, so the USPSTF considers indirect evidence. To guide its selection of indirect evidence, the USPSTF constructs a "chain of evidence" within an analytic framework. For each key question, the body of pertinent literature is critically appraised, focusing on the following 6 questions:

1. Do the studies have the appropriate research design to answer the key question(s)?
2. To what extent are the existing studies of high quality? (i.e., what is the internal validity?)
3. To what extent are the results of the studies generalizable to the general U.S. primary care population and situation? (i.e., what is the external validity?)
4. How many studies have been conducted that address the key question(s)? How large are the studies? (i.e., what is the precision of the evidence?)
5. How consistent are the results of the studies?
6. Are there additional factors that assist the USPSTF in drawing conclusions (e.g., presence or absence of dose–response effects, fit within a biologic model)?

The next step in the USPSTF process is to use the evidence from the key questions to assess whether there would be net benefit if the service were implemented. In 2001, the USPSTF published an article that documented its systematic processes of evidence evaluation and recommendation development. At that time, the USPSTF's overall assessment of evidence was described as good, fair, or poor. The USPSTF realized that this rating seemed to apply only to how well studies were conducted and did not fully capture all of the issues that go into an overall assessment of the evidence about net benefit. To avoid confusion, the USPSTF has changed its terminology. Whereas individual study quality will continue to be characterized as good, fair, or poor, the term certainty will now be used to describe the USPSTF's assessment of the overall body of evidence about net benefit of a preventive service and the likelihood that the assessment is correct. Certainty will be determined by considering all 6 questions listed above; the judgment about certainty will be described as high, moderate, or low.

In making its assessment of certainty about net benefit, the evaluation of the evidence from each key question plays a primary role. It is important to note that the USPSTF makes recommendations for real-world medical practice in the United States and must determine to what extent the evidence for each key question—even evidence from screening RCTs or treatment RCTs—can be applied to the general primary care population. Frequently, studies are conducted in highly selected populations under special conditions. The USPSTF must consider differences between the general primary care population and the populations studied in RCTs and make judgments about the likelihood of observing the same effect in actual practice.

It is also important to note that one of the key questions in the analytic framework refers to the potential harms of the preventive service. The USPSTF considers the evidence about the benefits and harms of preventive services separately and equally. Data about harms are often obtained from observational studies because harms observed in RCTs may not be representative of those found in usual practice and because some harms are not completely measured and reported in RCTs.

Putting the body of evidence for all key questions together as a chain, the USPSTF assesses the certainty of net benefit of a preventive service by asking the 6 major questions listed above. The USPSTF would rate a body of convincing evidence about the benefits of a service that, for example, derives from several RCTs of screening in which the estimate of benefits can be generalized to the general primary care population as "high" certainty (see the "Rating Scheme for the Strength of the Recommendations" field). The USPSTF would rate a body of evidence that was not clearly applicable to general practice or has other defects in quality, research design, or consistency of studies as "moderate" certainty. Certainty is "low" when, for example, there are gaps in the evidence linking parts of the analytic framework, when evidence to determine the harms of treatment is unavailable, or when evidence about the benefits of treatment is insufficient. Table 4 in the methodology document listed below (see the "Availability of Companion Documents" field) summarizes the current terminology used by the USPSTF to describe the critical assessment of evidence at all 3 levels: individual studies, key questions, and overall certainty of net benefit of the preventive service.

Sawaya GF, Guirguis-Blake J, LeFevre M, Harris R, Petitti D; U.S. Preventive Services Task Force. Update on the methods of the U.S. Preventive Services Task Force: estimating certainty and magnitude of net benefit. Ann Intern Med. 2007;147(12):871-875. [5 references].

I Statements

For I statements, the USPSTF has a new plan to commission its Evidence-based Practice Centers to collect information in 4 domains pertinent to clinical decisions about prevention and to report this information routinely. This plan is described in the paper: Petitti DB et al. Update on the methods of the U.S. Preventive Services Task Force: insufficient evidence. Ann Intern Med. 2009;150:199-205. http://annals.org/article.aspx?articleid=744255

The first domain is potential preventable burden of suffering from the condition. When evidence is insufficient, provision of an intervention designed to prevent a serious condition (such as dementia) might be viewed more favorably than provision of a service designed to prevent a condition that does not cause as much suffering (such as rash). The USPSTF recognized that "burden of suffering" is subjective and involves judgment. In clinical settings, it should be informed by patient values and concerns.

The second domain is potential harm of the intervention. When evidence is insufficient, an intervention with a large potential for harm (such as major surgery) might be viewed less favorably than an intervention with a small potential for harm (such as advice to watch less television). The USPSTF again acknowledges the subjective nature and the difficulty of assessing potential harms: for example, how bad is a "mild" stroke?

The third domain is cost—not just monetary cost, but opportunity cost, in particular the amount of time a provider spends to provide the service, the amount of time the patient spends to partake of it, and the benefits that might derive from alternative uses of the time or money for patients, clinicians, or systems. Consideration of clinician time is especially important for preventive services with only insufficient evidence because providing them could "crowd out" provision of preventive services with proven value, services for conditions that require immediate action, or services more desired by the patient. For example, a decision to routinely inspect the skin could take up the time available to discuss smoking cessation, or to address an acute problem or a minor injury that the patient considers important.

The fourth domain is current practice. This domain was chosen because it is important to clinicians for at least 2 reasons. Clinicians justifiably fear that not doing something that is done on a widespread basis in the community may lead to litigation. More important, addressing patient expectations is a crucial part of the clinician–patient relationship in terms of building trust and developing a collaborative therapeutic relationship. The consequences of not providing a service that is neither widely available nor widely used are less serious than not providing a service accepted by the medical profession and thus expected by patients. Furthermore, ingrained care practices are difficult to change, and efforts should preferentially be directed to changing those practices for which the evidence to support change is compelling.

Although the reviewers did not explicitly recognize it when these domains were chosen, the domains all involve consideration of the potential consequences—for patients, clinicians, and systems—of providing or not providing a service. Others writing about medical decision making in the face of uncertainty have suggested that the consequences of action or inaction should play a prominent role in decisions.

Rating Scheme for the Strength of the Recommendations

What the U.S. Preventive Services Task Force (USPSTF) Grades Mean and Suggestions for Practice

Grade	Grade Definitions	Suggestions for Practice
A	The USPSTF recommends the service. There is high certainty that the net benefit is substantial.	Offer/provide this service.
B	The USPSTF recommends the service. There is high certainty that the net benefit is moderate or there is moderate certainty that the net benefit is moderate to substantial.	Offer/provide this service.
C	The USPSTF recommends selectively offering or providing this service to individual patients based on professional judgment and patient preferences. There is at least moderate certainty that the net benefit is small.	Offer/provide this service for selected patients depending on individual circumstances.
D	The USPSTF recommends against the service. There is moderate or high certainty that the service has no net benefit or that the harms outweigh the benefits.	Discourage the use of this service.
I Statement	The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of the service.	Read "Clinical Considerations" section of USPSTF Recommendation Statement (see the "Major

Grade	Grade Definitions	Suggestions for Practice
	Evidence is lacking, of poor quality or conflicting, and the balance of benefits and harms cannot be determined.	Recommendations" field). If the service is offered, patients should understand the uncertainty about the balance of benefits and harms.

USPSTF Levels of Certainty Regarding Net Benefit

Definition: The USPSTF defines certainty as "likelihood that the USPSTF assessment of the net benefit of a preventive service is correct." The net benefit is defined as benefit minus harm of the preventive service as implemented in a general, primary care population. The USPSTF assigns a certainty level based on the nature of the overall evidence available to assess the net benefit of a preventive service.

Level of Certainty	Description
High	The available evidence usually includes consistent results from well-designed, well-conducted studies in representative primary care populations. These studies assess the effects of the preventive service on health outcomes. This conclusion is therefore unlikely to be strongly affected by the results of future studies.
Moderate	The available evidence is sufficient to determine the effects of the preventive service on health outcomes, but confidence in the estimate is constrained by factors such as: • The number, size, or quality of individual studies • Inconsistency of findings across individual studies • Limited generalizability of findings to routine primary care practice • Lack of coherence in the chain of evidence As more information becomes available, the magnitude or direction of the observed effect could change, and this change may be large enough to alter the conclusion.
Low	The available evidence is insufficient to assess effects on health outcomes. Evidence is insufficient because of: • The limited number or size of studies • Important flaws in study design or methods • Inconsistency of findings across individual studies • Gaps in the chain of evidence • Findings not generalizable to routine primary care practice • A lack of information on important health outcomes More information may allow an estimation of effects on health outcomes.

Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

Comparison with Guidelines from Other Groups

External Peer Review

Internal Peer Review

Description of Method of Guideline Validation

Peer Review. Before the U.S. Preventive Services Task Force (USPSTF) makes its final determinations about recommendations on a given preventive service, the Evidence-based Practice Center and the Agency for Healthcare Research and Quality send a draft evidence review to 4 to

6 external experts and to Federal agencies and professional and disease-based health organizations with interests in the topic. The experts are asked to examine the review critically for accuracy and completeness and to respond to a series of specific questions about the document. After assembling these external review comments and documenting the proposed response to key comments, the topic team presents this information to the USPSTF in memo form. In this way, the USPSTF can consider these external comments before it votes on its recommendations about the service. Draft recommendation statements are then circulated for comment among reviewers representing professional societies, voluntary organizations, and Federal agencies, as well as posted on the USPSTF Web site for public comment. These comments are discussed before the final recommendations are confirmed.

Response to Public Comment. A draft version of this recommendation statement was posted for public comment on the USPSTF Web site from May 21 to June 20, 2013. All comments received were reviewed during the creation of the final recommendation statement. Based on public feedback, the USPSTF separated its recommendation on fluoride supplementation and the application of fluoride varnish into 2 parts to increase clarity surrounding the relevant populations for each intervention. The USPSTF expanded its rationale for why it recommends fluoride varnish for all infants and children once their primary teeth have erupted, rather than only those deemed to be at "high" risk, and why it believes that the available evidence was sufficient to make this recommendation for nondental primary care providers. The USPSTF added language concerning potential implementation issues for the use of fluoride varnish by primary care professionals. The USPSTF also clarified the definitions of "primary care provider," "dental practitioner," and "inadequate water fluoridation." Finally, the USPSTF included an explanation of the target age range for this recommendation and provided additional details on enamel fluorosis.

Comparison with Guidelines from Other Groups. Recommendations for screening from the following groups were discussed: the American Academy of Pediatrics, the American Dental Association, the Centers for Disease Control and Prevention, The American Academy of Pediatric Dentistry, and the American Academy of Family Physicians.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The type of evidence supporting the recommendations is not specifically stated.

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Preventive Interventions

- The U.S. Preventive Services Task Force (USPSTF) found adequate evidence that oral fluoride supplementation, also known as dietary fluoride supplementation, in children who have low levels of fluoride in their water and application of fluoride varnish to the primary teeth of all children can each provide moderate benefit in preventing dental caries.
- The USPSTF found insufficient evidence on the benefits of provider education of parents regarding oral hygiene practices to prevent dental caries in their children.

Screening

The USPSTF found no studies addressing the direct effect of routine oral screening examinations performed by primary care clinicians on improved clinical outcomes in children younger than 5 years.

Potential Harms

Preventive Interventions

- The U.S. Preventive Services Task Force (USPSTF) found adequate evidence of a link between early childhood exposure to systemic fluoride and enamel fluorosis, a visible change in the appearance of the enamel due to altered mineralization. Fluorosis can range from mild (small white spots or streaks) to severe (discoloration, pitting, or rough enamel), depending on the overall systemic fluoride exposure level

over time.

- No studies specifically reported on the risk for fluorosis with fluoride varnish; however, compared with other topical fluoride interventions, systematic exposure to fluoride is low after varnish application. It is important to consider a child's overall systemic exposure to fluoride from multiple sources (e.g., water fluoridation, toothpaste, supplements, and/or varnish), but in the United States, enamel fluorosis presents as mild cosmetic changes in >99% of cases.
- The USPSTF concludes that there is limited evidence about the harms associated with fluoride varnish or other preventive interventions for dental caries, but that these risks are likely small.

Screening

The USPSTF found no studies addressing the magnitude of harms of screening children from birth to age 5 years for dental caries or future risk for dental caries in the primary care setting.

Qualifying Statements

Qualifying Statements

- The U.S. Preventive Services Task Force (USPSTF) makes recommendations about the effectiveness of specific clinical preventive services for patients without related signs or symptoms.
- It bases its recommendations on the evidence of both the benefits and harms of the service and an assessment of the balance. The USPSTF does not consider the costs of providing a service in this assessment.
- The USPSTF recognizes that clinical decisions involve more considerations than evidence alone. Clinicians should understand the evidence but individualize decision making to the specific patient or situation. Similarly, the USPSTF notes that policy and coverage decisions involve considerations in addition to the evidence of clinical benefits and harms.
- Recommendations made by the USPSTF are independent of the U.S. government. They should not be construed as an official position of the Agency for Healthcare Research and Quality or the U.S. Department of Health and Human Services.

Implementation of the Guideline

Description of Implementation Strategy

The experiences of the first and second U.S. Preventive Services Task Force (USPSTF), as well as that of other evidence-based guideline efforts, have highlighted the importance of identifying effective ways to implement clinical recommendations. Practice guidelines are relatively weak tools for changing clinical practice when used in isolation. To effect change, guidelines must be coupled with strategies to improve their acceptance and feasibility. Such strategies include enlisting the support of local opinion leaders, using reminder systems for clinicians and patients, adopting standing orders, and audit and feedback of information to clinicians about their compliance with recommended practice.

In the case of preventive services guidelines, implementation needs to go beyond traditional dissemination and promotion efforts to recognize the added patient and clinician barriers that affect preventive care. These include clinicians' ambivalence about whether preventive medicine is part of their job, the psychological and practical challenges that patients face in changing behaviors, lack of access to health care or of insurance coverage for preventive services for some patients, competing pressures within the context of shorter office visits, and the lack of organized systems in most practices to ensure the delivery of recommended preventive care.

Dissemination strategies have changed dramatically in this age of electronic information. While recognizing the continuing value of journals and other print formats for dissemination, the USPSTF will make all its products available through its Web site. The combination of electronic access and extensive material in the public domain should make it easier for a broad audience of users to access USPSTF materials and adapt them for their local needs. Online access to USPSTF products also opens up new possibilities for the appearance of the annual, pocket-size *Guide to Clinical Preventive Services*.

To be successful, approaches for implementing prevention have to be tailored to the local level and deal with the specific barriers at a given site, typically requiring the redesign of systems of care. Such a systems approach to prevention has had notable success in established staff-model health maintenance organizations, by addressing organization of care, emphasizing a philosophy of prevention, and altering the training and

incentives for clinicians. Staff-model plans also benefit from integrated information systems that can track the use of needed services and generate automatic reminders aimed at patients and clinicians, some of the most consistently successful interventions. Information systems remain a major challenge for individual clinicians' offices, however, as well as for looser affiliations of practices in network-model managed care and independent practice associations, where data on patient visits, referrals, and test results are not always centralized.

Implementation Tools

Mobile Device Resources

Patient Resources

Pocket Guide/Reference Cards

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Staying Healthy

IOM Domain

Effectiveness

Patient-centeredness

Identifying Information and Availability

Bibliographic Source(s)

U.S. Preventive Services Task Force. Prevention of dental caries in children from birth through age 5 years: U.S. Preventive Services Task Force recommendation statement. Pediatrics. 2014 Jun;133(6):1102-11. [41 references] PubMed

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

1989 (revised 2014 Jun)

Guideline Developer(s)

U.S. Preventive Services Task Force - Independent Expert Panel

Guideline Developer Comment

The U.S. Preventive Services Task Force (USPSTF) is a federally-appointed panel of independent experts. Conclusions of the U.S. Preventive Services Task Force do not necessarily reflect policy of the U.S. Department of Health and Human Services or its agencies.

Source(s) of Funding

The U.S. Preventive Services Task Force (USPSTF) is an independent, voluntary body. The U.S. Congress mandates that the Agency for Healthcare Research and Quality support the operations of the USPSTF.

Guideline Committee

U.S. Preventive Services Task Force

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**Members of the Task Force at the time this recommendation was finalized. For a list of current Task Force members, go to http://www.uspreventiveservicestaskforce.org/Page/Name/our-members*.

Financial Disclosures/Conflicts of Interest

The U.S. Preventive Services Task Force (USPSTF) has an explicit policy concerning conflict of interest. All members disclose at each meeting if they have a significant financial, professional/business, or intellectual conflict for each topic being discussed. USPSTF members with conflicts may be recused from discussing or voting on recommendations about the topic in question.

Financial Disclosure: The authors have indicated they have no financial relationships relevant to this article to disclose.

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: Calonge N. Prevention of dental caries in preschool children: recommendations and rationale. Am J Prev Med. 2004 May;26(4):326-9.

This guideline meets NGC's 2013 (revised) inclusion criteria.

Guideline Availability

Electronic copies: Available from the U.S. Preventive Services Web site.

Availability of Companion Documents

The following are available:

Evidence Reviews:

- Chou R, Cantor A, Zakher B, Mitchell JP, Pappas M. Preventing dental caries in children <5 years: systematic review updating U.S. Preventive Services Task Force (USPSTF) recommendation. Pediatrics 2013;132:332–350.
- Chou R, Cantor A, Zakher B, Mitchell JP, Pappas M. Prevention of dental caries in children younger than 5 years old: systematic review to update the U.S. Preventive Services Task Force recommendation. Evidence Synthesis No. 104. AHRQ Publication No. 12-05170-EF-1. Rockville (MD): Agency for Healthcare Research and Quality; 2014 May. 129 p.

Electronic copies: Available from the U.S. Preventive Services Task Force (USPSTF) Web site .

Background Articles:

- Barton MB et al. How to read the new recommendation statement: methods update from the U.S. Preventive Services Task Force. Ann Intern Med 2007;147:123-127.
- Guirguis-Blake J et al. Current processes of the U.S. Preventive Services Task Force: refining evidence-based recommendation development. Ann Intern Med 2007;147:117-122.
- Sawaya GF et al. Update on the methods of the U.S. Preventive Services Task Force: estimating certainty and magnitude of net benefit. Ann Intern Med 2007;147:871-875.

Electronic copies: Available from USPSTF Web site .

The following are also available:

- The guide to clinical preventive services, 2014. Recommendations of the U.S. Preventive Services Task Force. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2014. 144 p. Electronic copies available from the AHRQ Web site . See the related QualityTool summary on the Health Care Innovations Exchange Web site .
- Prevention of dental caries in children from birth through age 5 years: clinical summary of U.S. Preventive Services Task Force recommendation; 2014 May. Electronic copies: Available from USPSTF Web site .
- Prevention of dental caries in young children. USPSTF Final research plan. 2012 Dec. Electronic copies: Available from USPSTF Web site .
- Preventing dental caries in children <5 years: systematic review updating USPSTF recommendation. Supplemental information. Electronic copies: Available to subscribers from the Pediatrics Web site .

The Electronic Preventive Services Selector (ePSS) is an application designed to provide primary care clinicians and health care teams timely decision support regarding appropriate screening, counseling, and preventive services for their patients. It is based on the current, evidence-based recommendations of the USPSTF and can be searched by specific patient characteristics, such as age, sex, and selected behavioral risk factors.

Patient Resources

The following is available:

- Preventing dental caries in children from birth through age five years. Understanding task force recommendations. Consumer fact sheet. Rockville (MD): U.S. Preventive Services Task Force. 2014 May. 4 p. Electronic copies: Available from the U.S. Preventive Services Task Force (USPSTF) Web site .

Print copies: Available from the Agency for Healthcare Research and Quality Publications Clearinghouse. For more information, go to http://www.ahrq.gov/research/publications/index.html or call 1-800-358-9295 (U.S. only).

Myhealthfinder is a tool that provides personalized recommendations for clinical preventive services specific to the user's age, gender, and pregnancy status. It features evidence-based recommendations from the USPSTF and is available at www.healthfinder.gov .

Please note: This patient information is intended to provide health professionals with information to share with their patients to help them better

understand their health and their diagnosed disorders. By providing access to this patient information, it is not the intention of NGC to provide specific medical advice for particular patients. Rather we urge patients and their representatives to review this material and then to consult with a licensed health professional for evaluation of treatment options suitable for them as well as for diagnosis and answers to their personal medical questions. This patient information has been derived and prepared from a guideline for health care professionals included on NGC by the authors or publishers of that original guideline. The patient information is not reviewed by NGC to establish whether or not it accurately reflects the original guideline's content.

NGC Status

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